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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/688,238	10/18/2003	Raffi Nazare Elmadjian	NGC-212/12-1167	2471

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EXAMINER

CHEN, KIN-CHAN

ART UNIT	PAPER NUMBER
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1765

DATE MAILED: 11/10/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/688,238	Applicant(s) ELMADJIAN ET AL. A	
	Examiner Kin-Chan Chen	Art Unit 1765	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 October 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1 and 3-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1 and 3-16 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

- (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 1, 3-7 and 14-16 are rejected under 35 U.S.C. 103(a) as obvious over Iacoponi et al. (US 6,468,889; hereinafter "Iacoponi") in view of Yu (US 5,395,799) or Hussein et al. (US 6,406,995; hereinafter "Hussein") as evidenced by Demmin (US 6,635,185), Lin (US 6,348,301) and Park (US 2002/0088608).

In a method for fabricating a semiconductor device, Iacoponi teaches a method for etching a through via on a wafer of semiconductor material. The wafer has a front side surface and a backside surface. A layer of photoresist material may be applied to the backside surface of the wafer. The layer of photoresist may be exposed to a light source. The developed photoresist may be removed to form at least one via in the remaining photoresist layer. The semiconductor material adjacent to the at least one via may be gas plasma etched to form a through via between the backside surface and the front side surface of the wafer (col. 4, lines 56-65; col. 5, lines 1-50; Figs. 2 and 3).

Unlike the claimed invention, Iacoponi does not teach baking the photoresist to harden the photoresist. However, it is well known in the art that the photoresist may be baked to harden the photoresist and improve the etchant resistant. Yu (col. 4, lines 56-64) or Hussein (col. 4, lines 9-10) is only relied on to show said well-known feature. Because it is a well-known feature in the art of in the art of semiconductor device fabrication and because it is disclosed by Yu or Hussein, hence, it would have been obvious to one with ordinary skill in the art to bake the photoresist in the process of Iacoponi so as to harden the photoresist and improve the etchant resistant with a reasonable expectation of success. After etching, it is expected to remove the hardened photoresist layer because it is not needed in the final product.

The combined Iacoponi and Yu (or Hussein) teaches baking the photoresist. Since baking process is not completed instantaneously, it is carried out in a period of time. It can be divided by end-user into the first, the second process, as many processing steps as wanted, depending on the product requirement. The baking time and temperature are merely matter of choice of design depending on the thickness of photoresist and type of photoresist being used. Furthermore, The baking time and temperature are also known to be result effective variables and commonly determined by routine experiment. The process of conducting routine experimentations (optimizations) so as to produce an expected result is obvious to one of ordinary skill in the art, see Lin (US 6,348,301; Fig.3 and col. 4) and Park (US 2002/0088608; [0133]-[0166]) in the record as evidence to show multiple-step baking with various temperatures and baking time.

Changes in compositions, temperature, concentrations, or other process conditions (e.g., processing time) of a process do not impart patentability unless the recited ranges are critical (i.e., they produce a new and unexpected result that differs in kind and not merely in degree from the result of the prior art). In re Woodruff, 16USPQ2d 1934,1936 (Fed. Cir.1990); In re Hoeschele, 406 F.2d 1403, 160 USPQ 809; In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). MPEP 2144.05 II.

As to dependent claim 4, see Iaconi, col. 5, lines 32-38.

The above-cited claims differ from the combined prior art by specifying well-known features (such as indium phosphide in claim 14; devices in claim 15) to the art of semiconductor device fabrication and using various processing parameters (such as claims 5, 6, and 7). However, same were known to be result effective variables and commonly determined by routine experiment. The process of conducting routine experimentations (optimizations) so as to produce an expected result is obvious to one of ordinary skill in the art. In the absence of showing criticality or new, unexpected results, a person having ordinary skill in the art would have found it obvious to modify the combined prior art by performing routine experiments to obtain optimal result and adding any of same well-known features to same in order to provide their art recognized advantages and produce an expected result with a reasonable expectation of success. Also see Demmin (US 6,635,185) in the record as evidence. The examiner takes official notice of facts that applicant did not traverse the aforementioned conventionality (e.g., well-known features, common knowledge), which have been stated in the previous office action (July 19, 2005).

Dependant claim 16 differs from the combined prior art by specifying various sizes, dimensions (thickness) of parts. Because same are merely a matter of choices of

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design depending on the product requirements, it would be obvious to one skilled in the art to use various dimensions for fabricating a semiconductor device in order to accommodate the specific product design and meet the product requirement.

3. Claims 8-13 are rejected under 35 U.S.C. 103(a) as being unpatentable over Iacoponi and Yu as evidenced by Demmin, Lin (US 6,348,301) and Park (US 2002/0088608) as applied to claim 1 above, and further in view of Hayasaka et al. (US 6,649,082; hereinafter "Hayasaka") or Fathimulla et al. (US 5,338,394; hereinafter "Fathimulla").

Unlike the claimed invention, the combined Iacoponi and Yu does not teach using etching gas (etchant) of a mixture of hydrogen, argon, BCl_3 , and HBr , for etching semiconductor, however, it is well known in the art of semiconductor device fabrication. Hayasaka (col. 1, lines 24-30; col. 6, lines 7-8) or Fathimulla (col. 2, lines 5-7) is only relied on to show said etchant for etching semiconductor. Because it is a well-known feature in the art of semiconductor device fabrication and because it is disclosed by Hayasaka or Fathimulla, hence, it would have been obvious to one with ordinary skilled in the art to use said etchant in the process of the combined prior art in order to efficiently etch the semiconductor.

The above-cited claims differ from the combined prior art by specifying various processing parameters (such as claims 9-13). However, same were known to be result effective variables and commonly determined by routine experiment. The process of conducting routine experimentations (optimizations) so as to produce an expected result

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is obvious to one of ordinary skill in the art. In the absence of showing criticality or new, unexpected results, a person having ordinary skill in the art would have found it obvious to modify the combined prior art by performing routine experiments to obtain optimal result with a reasonable expectation of success. Also see Demmin (US 6,635,185) in the record as evidence.

Response to Arguments

4. Applicant's arguments filed October 17, 2005 have been fully considered but they are not persuasive.

Applicant has argued that the prior art does not teach two-step heating process, temperature range, and heating time. It is not persuasive. As has been stated in the office action, the combined Iaconi and Yu (or Hussein) teaches baking the photoresist. Since baking process is not completed instantaneously, it is carried out in a period of time. It can be divided by end-user into the first, the second process, as many processing steps as wanted, depending on the product requirement. The baking time and temperature are merely matter of choice of design depending on the thickness of photoresist and type of photoresist being used. Furthermore, The baking time and temperature are also known to be result effective variables and commonly determined by routine experiment. The process of conducting routine experimentations (optimizations) so as to produce an expected result is obvious to one of ordinary skill in the art, see Lin (US 6,348,301; Fig.3 and col. 4) and Park (US 2002/0088608; [0133])-

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[0166]) in the record as evidence to show multiple-step baking with various temperatures and baking time.

Changes in compositions, temperature, concentrations, or other process conditions (e.g., processing time) of a process do not impart patentability unless the recited ranges are critical (i.e., they produce a new and unexpected result that differs in kind and not merely in degree from the result of the prior art). In re Woodruff, 16USPQ2d 1934,1936 (Fed. Cir.1990); In re Hoeschele, 406 F.2d 1403, 160 USPQ 809; In re Boesch, 617 F.2d 272, 205 USPQ 215 (CCPA 1980). MPEP 2144.05 II.

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., using two-step heating process to avoid thermal shock of photoresist) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Conclusion

6. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Demmin (US 6,635,185; col. 7, lines 5-25) discloses that one skilled in the art of plasma etching and cleaning may vary type of plasma etching (RIE, HDP, plasma etching.), composition, flow rate, temperature, pressure, power, time, bias, .. accordingly to etch a desired material satisfactorily. Lin (US 6,348,301; Fig.3 and col. 4) and Park (US 2002/0088608; [0133]-[0166]) show multiple-step baking with various temperatures and baking times.

7. THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Kin-Chan Chen whose telephone number is (571) 272-1461. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on (571) 272-1465. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you

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have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

November 4, 2005

K. C. Chen

Kin-Chan Chen
Primary Examiner
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